Eur J Vasc Endovasc Surg (2010) **39**, 153–154

INVITED COMMENTARY

Carotid Denervation by Adventitial Stripping: A Promising Treatment of Carotid Sinus Syndrome?

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Submitted 2 October 2009; accepted 3 October 2009
Available online 6 December 2009

The baroreflex is an important component of the physiological short-term control of the blood pressure. Baroreceptors are mainly located in the wall of the aortic arch and of the internal carotid artery (ICA). The carotid sinus nerve (CSN)[a] contains afferent fibres travelling from the carotid sinus' baroreceptors located in the adventitia of the ICA. It joins the glossopharyngeal (IX) nerve and ends in the nucleus tractus solitarius in the brain stem. The efferent loop is conducted by the vagus (X) nerve to the heart leading to a physiologic bradycardia and inhibited atrioventricular conduction, in response to systemic hypertension. Also, a blocked sympathetic nerve system causes venodilatation, decreasing ventricular preload, and vasodilatation, both leading to decreased blood pressure.

Carotid sinus syndrome (CSS) is caused by a pathologic overshoot of this baroreflex and is characterised by exaggerated bradycardia and hypotension in response to carotid sinus stimulation, in situations such as shaving, wearing tight collar or head turning. The triggering events might vary considerably overtime in any individual patient, but the syndrome can be reproduced by carotid sinus massage.[2] CSS prevalence could be as high as 45% in elderly patients.[3] If left untreated, CSS mortality rates could exceed 25% within 5 years.[4]

The clinical manifestation of the syndrome is typically of recurrent syncope, but also of dizziness and falls. It is predominantly either cardioinhibitory (severe bradycardia or asystole) or vasodepressor (hypotension). The contribution of each of these two factors to systemic hypotension and cerebral hypoperfusion may differ considerably and should be assessed before embarking on specific treatments.

While current European Society of Cardiology and American College of Cardiology/American Heart Association guidelines[2,5] recommend dual-chamber pacing for repeated syncope in patients in whom the cardioinhibitory response is the attributable cause of symptoms, pacemaker implantation is not effective in vasodepressor CSS. Therefore, various surgical approaches aiming at interrupting the pathological baroreceptor reflex have been described. Among those, transection of the glossopharyngeal nerve requires a craniotomy and may cause loss of gag reflex and taste perception of the posterior third of the tongue. A simple transection of the carotid nerve is likely not sufficient, as separate connections to pharyngeal branches of the vagus nerve, vagus nerve itself, sympathetic trunk, and superior cervical ganglion were commonly observed in a recent anatomical study.[1]

In this issue of the *Journal*, Toorop et al.[6] evaluated the efficacy of carotid denervation by adventitial stripping of the ICA in 27 patients with a history of repeated syncope and dizziness and in whom CCS was confirmed by carotid sinus massage. Within the 30-day follow up period, 25/27 patients became syncope free and 24/27 pacemaker free. Heart rate significantly increased one week postoperatively, however

DOI of original article: 10.1016/j.ejvs.2009.09.009.
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[a] Various other names for the CSN include nerve of Hering, ramus descensus glossopharyngei, ramus caroticus glossopharyngei, intercarotid nerve or Castro nerve.[1]

doi:10.1016/j.ejvs.2009.11.001

without clinical relevance, while blood pressure did not statistically change.

These early results are certainly encouraging, but the authors should report long-term follow of these patients before this original technique for the treatment of CSS could be further assessed and possibly recommended. Indeed, reinnervation of the baroreceptive regions has been demonstrated, at least in rats.[7]

In the meantime, as Toorop et al.[1] correctly pointed out, their anatomical study supported the contention that dissection during carotid endarterectomy should be limited to the circumference of the intended clamping place of the distal ICA, thereby avoiding damage of the CSN or carotid sinus afferents near the carotid bifurcation and peri- or postoperative changes in blood pressure or heart rate in endarterectomised patients.

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